¹ Interventional cardiologist full member
of Sociedade Brasileira de Hemodinâmica e
Cardiologia Intervencionista, São Paulo,
São Paulo, Brazil.

Same-day hospital discharge after percutaneous coronary intervention: management, safety and satisfaction of the patient

Alta hospitalar no mesmo dia pós-intervenção
coronária percutânea: gestão com segurança
e satisfação do paciente

Fabio Conejo^{1ID}

DOI: 10.31160/JOTCI202129A202104

Percutaneous coronary intervention (PCI) became the most frequent modality of revascularization to treat coronary artery disease. Historically, most patients undergoing elective PCI remained hospitalized, overnight or more, aiming to detect and possible peri- and post-procedural complications, including access site complications, bleeding, stent thrombosis and peri-procedural myocardial infarction (MI).¹ Currently, there is a demand for a simplified and efficient out-hospital flow, keeping the best practices in hospital services and patient care. Overtime, the improvement of PCI techniques, combined with technological advancement of devices (e.g. guidewires, stents and intravascular imaging-guidance), and the efficacy of adjuvant medication, improved substantially the safety and rate of procedure success, by reducing complications and consequently shortening in-hospital stay.²⁻⁵

While the adoption of technological advances allowed a significant increase in the number of PCI indication, it also resulted in higher institutional costs per patient. Aiming to optimize the in-hospital stay of the patient, the same-day discharge (SDD) strategy was developed. Same-day discharge is part of a hospital management policies cost-containment logistics maintaining that includes clinical effectiveness, safety and satisfaction of the patients undergoing to PCI.⁶⁻⁹ Same-day discharge safety has been evaluated in many small randomized controlled trials,¹⁰⁻¹⁴ observational studies,¹⁵⁻¹⁹ and meta-analyses.^{20,21} Even though, there are bold evidences coming from general elective-PCI studies, still, there are limited data on the clinical and angiographic characteristics associated with the successful practice of SDD.

Pozetti et al. presented close to 10 years of SDD experience (from 2012 to 2020), showing a well-structured out-patient PCI program. Overtime, there was an elevation of SDD from 14.0% to 27.5% in 2012 and 2020, respectively, for both clinical presentations acute and elective. In the latter, 52.5% of elective cases received hospital discharge after a short 6-hour period of observation, regardless of clinical risk or target lesion complexity of the patients. Moreover, the adoption of SDD strategy was gradually increased its complexity: number of diabetics (from 28% to 42%); bifurcation lesions (from 5% to 15%); drug-eluting stents implantation rate; and the complex lesions (types B2 or C) (from 28% to 46%). This change in the institutional paradigm was no translated in adverse events. The major adverse cardiac events (MACE), in-stent thrombosis, readmissions, peri-procedure MI or access site complications rates were not dissimilar between 2012 and 2020.²²

Since the first SDD reports were published nearly three decades ago,²³ becomes clear that the implementation of SDD strategy faced some challenges, until its acceptance as a viable strategy for elective PCI patients. Mostly due to medical-legal safety

How to cite this article:

Conejo F. Same-day hospital discharge after percutaneous coronary intervention: management, safety and satisfaction of the patient. J Transcat Intervent. 2021;29:eA202104. <https://doi.org/10.31160/JOTCI202129A202104>

Corresponding author:

Fabio Conejo
Rua Professora Carolina Ribeiro, 71,
apto. 151 – Jardim Vila Mariana
CEP: 04116-020 – São Paulo, SP, Brasil
E-mail: fabioconejo@yahoo.com.br

Received on:

Aug 13, 2021

Accepted on:

Sep 14, 2021

Esta obra está licenciada sob uma Licença
Creative Commons Atribuição 4.0 Internacional.

issues, patient preference or satisfaction, and difficulties in establishing a proper cost analysis.²⁴⁻²⁸ In contrast, the evidence¹⁰ supports the notion most patients prefer SDD, and the ability to return to the comfort of their home following their PCI, compared prolonged in-hospital stay. A 30-day post-PCI follow-up analysis found that 79% of SDD patients were satisfied with the timing of their discharge. Furthermore, most of them reported a preference for SDD for future PCI procedures, with 80% against 68% in the SDD and overnight groups, respectively. The same pattern was also observed in subsequent studies.⁶

The secret of success for SDD is reflected in the efficacy and safety of this strategy, not only patient preference, albeit patient satisfaction is also a cornerstone in the private sector. A recently published meta-analysis did not find difference in MACE between SDD and overnight stay.^{20,29} Furthermore, in the group of patients hospitalized, there was a 8% of in-hospital-related infections or fall-related injuries.^{30,31} From the institution operational perspective, the SDD for elective-PCI may offers a myriad of benefits. Since, several units are currently unable to meet the admission demands of the emergency departments. The in-hospital beds deficiency was magnified by the recent coronavirus disease 2019 (COVID-19) pandemic, often as a result of the failure in optimizing the discharge flow of in-hospital patients. The implementation of SDD strategy is a viable way to increase in-hospital bed availability. Although, it is important to emphasize the need to embrace specific organizational protocols. The protocols must include: specialized multi-professional team for the pre-angioplasty out-patient clinics; early detection of peri- or post-procedural complications; to provide adequate guidance to the patients upon discharge; and pre-procedure checklist to verify eligible cases above all to detect high risk patients and lesions that are not eligible to SDD.

Same-day discharge strategy for elective-PCI may also offer an economical advantage to facilities or hospitals. The health system reduction of cost per patient can be as much as 50%, mostly due to accommodation and food supplies.^{6,32} When the radial access site is preferred, the reduction of cost is even greater, through reduction of vascular complications or the need to use vascular closure devices, required in the femoral access site.^{6,32} A conservative estimative in the US, showed that SDD strategy would save around US\$200 to 500 million per year in the health care system.^{4,33}

Finally, the future of SDD strategy is very promising and it came to stay sit in the audacious managers table, but some limitations must be acknowledged. Mainly, the supporting evidences come from observational studies or small randomized trials. Still, the American College of Cardiology (ACC) recently published an expert consensus for SDD, providing detailed and relevant information aligned with contemporary practices, as well as strategies

to implement a safe and effective SDD program.³⁴ The increasingly pressing need to optimize cost-effectiveness makes the SDD strategy an essential practice, which should be encouraged in properly selected cases, even in patients with low-risk acute clinical conditions.

REFERENCES

1. EPILOG Investigators. Platelet glycoprotein IIb/IIIa receptor blockade and low-dose heparin during percutaneous coronary revascularization. *N Engl J Med*. 1997;336(24):1689-96. <https://doi.org/10.1056/NEJM199706123362401>
2. Singh M, Rihal CS, Gersh BJ, Lennon RJ, Prasad A, Sorajja P, et al. Twenty-five-year trends in in-hospital and long-term outcome after percutaneous coronary intervention: a single-institution experience. *Circulation*. 2007;115(22):2835-41. <https://doi.org/10.1161/CIRCULATIONAHA.106.632679>
3. Umans VA, Kloeg PH, Bronzwaer J. The CAPTURE trial. *Lancet*. 1997;350(9075):445. [https://doi.org/10.1016/S0140-6736\(05\)64172-4](https://doi.org/10.1016/S0140-6736(05)64172-4)
4. Shroff A, Kupfer J, Gilchrist IC, Caputo R, Speiser B, Bertrand OF, et al. Same-Day Discharge After Percutaneous Coronary Intervention: Current Perspectives and Strategies for Implementation. *JAMA Cardiol*. 2016;1(2):216-23. <https://doi.org/10.1001/jamacardio.2016.0148>
5. Chambers CE, Dehmer GJ, Cox DA, Harrington RA, Babb JD, Popma JJ, et al.; Society for Cardiovascular Angiography and Interventions. Defining the length of stay following percutaneous coronary intervention: an expert consensus document from the Society for Cardiovascular Angiography and Interventions. Endorsed by the American College of Cardiology Foundation. *Catheter Cardiovasc Interv*. 2009;73(7):847-58. <https://doi.org/10.1002/ccd.22100>
6. Glaser R, Gertz Z, Matthai WH, Wilensky RL, Weiner M, Kolansky D, et al. Patient satisfaction is comparable to early discharge versus overnight observation after elective percutaneous coronary intervention. *J Invasive Cardiol*. 2009;21(9):464-7. PMID: 19726820.
7. Koch KT, Piek JJ, de Winter RJ, David GK, Mulder K, Lie KI. Shortterm (4 hours) observation after elective coronary angioplasty. *Am J Cardiol*. 1997;80(12):1591-4. [https://doi.org/10.1016/s0002-9149\(97\)00786-8](https://doi.org/10.1016/s0002-9149(97)00786-8)
8. Koch KT, Piek JJ, Prins MH, de Winter RJ, Mulder K, Lie KI, et al. Triage of patients for short term observation after elective coronary angioplasty. *Heart*. 2000;83(5):557-63. <https://doi.org/10.1136/heart.83.5.557>
9. Slagboom T, Kiemeneij F, Laarman GJ, van der Wieken R. Outpatient coronary angioplasty: feasible and safe. *Catheter Cardiovasc Interv*. 2005;64(4):421-7. <https://doi.org/10.1002/ccd.20313>
10. Kim M, Muntner P, Sharma S, Choi JW, Stoler RC, Woodward M, et al. Assessing patient-reported outcomes and preferences for same-day discharge after percutaneous coronary intervention: results from a pilot randomized, controlled trial. *Circ Cardiovasc Qual Outcomes*. 2013;6(2):186-92. <https://doi.org/10.1161/CIRCOUTCOMES.111.000069>
11. Heyde GS, Koch KT, de Winter RJ, Dijkgraaf MG, Klees MI, Dijkman LM, et al. Randomized trial comparing same-day discharge with overnight hospital stay after percutaneous coronary intervention: results of the Elective PCI in Outpatient Study (EPOS). *Circulation*. 2007;115(17):2299-306. <https://doi.org/10.1161/CIRCULATIONAHA.105.591495>

12. Bertrand OF, De Larochelière R, Rodés-Cabau J, Proulx G, Gleeton O, Nguyen CM, et al.; Early Discharge After Transradial Stenting of Coronary Arteries Study Investigators. A randomized study comparing same-day home discharge and abciximab bolus only to overnight hospitalization and abciximab bolus and infusion after transradial coronary stent implantation. *Circulation*. 2006;114(24):2636-43. <https://doi.org/10.1161/CIRCULATIONAHA.106.638627>
13. Bertrand OF, Rodés-Cabau J, Larose E, Nguyen CM, Roy L, Déry JP, et al. One-year clinical outcome after abciximab bolus only compared with abciximab bolus and 12-hour infusion in the Randomized EARly Discharge after Transradial Stenting of Coronary Arteries (EASY) Study. *Am Heart J*. 2008;156(1):135-40. <https://doi.org/10.1016/j.ahj.2008.02.006>
14. Clavijo LC, Cortes GA, Jolly A, Tun H, Mehra A, Gaglia MA Jr, et al. Same-day discharge after coronary stenting and femoral artery device closure: A randomized study in stable and low-risk acute coronary syndrome patients. *Cardiovasc Revasc Med*. 2016;17(3):155-61. <https://doi.org/10.1016/j.carrev.2016.03.003>
15. Amin AP, Pinto D, House JA, Rao SV, Spertus JA, Cohen MG, et al. Association of same-day discharge after elective percutaneous coronary intervention in the united states with costs and outcomes. *JAMA Cardiol*. 2018;3(11):1041-9. <https://doi.org/10.1001/jamacardio.2018.3029>
16. Gilchrist IC, Rhodes DA, Zimmerman HE. A single center experience with same-day transradial-PCI patients: a contrast with published guidelines. *Catheter Cardiovasc Interv*. 2012;79(4):583-7. <https://doi.org/10.1002/ccd.23159>
17. Jabara R, Gadesam R, Pendyala L, Chronos N, Crisco LV, King SB, et al. Ambulatory discharge after transradial coronary intervention: Preliminary US single-center experience (Sameday TransRadial Intervention and Discharge Evaluation, the STRIDE Study). *Am Heart J*. 2008;156(6):1141-6. <https://doi.org/10.1016/j.ahj.2008.07.018>
18. Rao SV, Kaltenbach LA, Weintraub WS, Roe MT, Brindis RG, Rumsfeld JS, et al. Prevalence and outcomes of same-day discharge after elective percutaneous coronary intervention among older patients. *JAMA*. 2011;306(13):1461-7. <https://doi.org/10.1001/jama.2011.1409>
19. Ziakas AA, Klinkle BP, Mildenberger CR, Fretz DE, Williams EM, Kinloch FR, et al. Safety of same-day-discharge radial percutaneous coronary intervention: a retrospective study. *Am Heart J*. 2003;146(4):699-704. [https://doi.org/10.1016/S0002-8703\(03\)00258-8](https://doi.org/10.1016/S0002-8703(03)00258-8)
20. Abdelaal E, Rao SV, Gilchrist IC, Bernat I, Shroff A, Caputo R, et al. Same-day discharge compared with overnight hospitalization after uncomplicated percutaneous coronary intervention: a systematic review and meta-analysis. *JACC Cardiovasc Interv*. 2013;6(2):99-112. <https://doi.org/10.1016/j.jcin.2012.10.008>
21. Bundhun PK, Soogund MZ, Huang WQ. Same day discharge versus overnight stay in the hospital following percutaneous coronary intervention in patients with stable coronary artery disease: a systematic review and meta-analysis of randomized controlled trials. *PLoS One*. 2017;12(1):e0169807. <https://doi.org/10.1371/journal.pone.0169807>
22. Pozetti AH, Lamas E, Santos MA, Trindade LF, Osti A, Franzotti P, et al. Clinical outcomes of patients undergoing elective percutaneous coronary intervention with same-day discharge. Ten-year follow-up. *J Transcat Intervent*. 2021;29:eA20210007. <https://doi.org/10.31160/JOTCI202129A20210007>
23. Kiemeneij F, Laarman GJ, Slagboom T, van der Wieken R. Outpatient coronary stent implantation. *J Am Coll Cardiol*. 1997;29(2):323-7. [https://doi.org/10.1016/s0735-1097\(96\)00486-x](https://doi.org/10.1016/s0735-1097(96)00486-x)
24. Bottner RK, Blankenship JC, Klein LW; International Committee of the Society for Cardiovascular Angiography and Interventions. Current usage and attitudes among interventional cardiologists regarding the performance of percutaneous coronary intervention (PCI) in the outpatient setting. *Catheter Cardiovasc Interv*. 2005;66(3):455-61. <https://doi.org/10.1002/ccd.20567>
25. Janus TJ. Same-day discharge after percutaneous coronary intervention. *JAMA*. 2012;307(3):251; author reply 252. <https://doi.org/10.1001/jama.2011.2015>
26. Mixon TA, Dehmer GJ. Drive-through angioplasty: is it safe or necessary? *Circulation*. 2006;114(24):2578-80. <https://doi.org/10.1161/CIRCULATIONAHA.106.668087>
27. Resnic FS. The case for outpatient coronary intervention: balancing charges and discharges. *Circulation*. 2007;115(17):2248-50. <https://doi.org/10.1161/CIRCULATIONAHA.107.696286>
28. Sheldon MW, Grines CL. Can percutaneous coronary intervention be performed safely as an outpatient procedure? *Nat Clin Pract Cardiovasc Med*. 2007;4(10):534-5. <https://doi.org/10.1038/ncpcardio0963>
29. Brayton KM, Patel VG, Stave C, de Lemos JA, Kumbhani DJ. Same-day discharge after percutaneous coronary intervention: a meta-analysis. *J Am Coll Cardiol*. 2013;62(4):275-85. <https://doi.org/10.1016/j.jacc.2013.03.051>
30. Perla RJ, Hohmann SE, Annis K. Whole-patient measure of safety: using administrative data to assess the probability of highly undesirable events during hospitalization. *J Healthc Qual*. 2013;35(5):20-31. <https://doi.org/10.1111/jhq.12027>
31. Zhang X, Hauck K, Zhao X. Patient safety in hospitals - a Bayesian analysis of unobservable hospital and specialty level risk factors. *Health Econ*. 2013;22(9):1158-74. <https://doi.org/10.1002/hec.2972>
32. Amin AP, Miller S, Rahn B, Caruso M, Pierce A, Sorensen K, et al. Reversing the "Risk-Treatment Paradox" of bleeding in patients undergoing percutaneous coronary intervention: risk-concordant use of bleeding avoidance strategies is associated with reduced bleeding and lower costs. *J Am Heart Assoc*. 2018;7(21):e008551. <https://doi.org/10.1161/JAHA.118.008551>
33. Popescu AM, Weintraub WS. Outpatient percutaneous coronary interventions: hospital and health system costs saving while maintaining patient safety. *JACC Cardiovasc Interv*. 2010;3(10):1020-1. <https://doi.org/10.1016/j.jcin.2010.09.001>
34. Writing Committee, Rao SV, Vidovich MI, Gilchrist IC, Gulati R, Gutierrez JA, Hess CN, et al. 2021 ACC Expert Consensus Decision Pathway on Same-Day Discharge After Percutaneous Coronary Intervention: A Report of the American College of Cardiology Solution Set Oversight Committee. *J Am Coll Cardiol*. 2021;77(6):811-25. <https://doi.org/10.1016/j.jacc.2020.11.013>